

CLAIMS

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1. The method of removing blockages of hydrates, paraffins, or the such like from the inside of a subsea pipeline by the steps of

landing a remotely operated vehicle on said subsea pipeline,

engaging said subsea pipeline with traction means which are powered to control the movement of said remotely operated vehicle along said pipeline,

sealingly engage the outer surface of said subsea pipeline,

flowing seawater over a portion of the outer surface of said subsea pipeline,

heating the seawater which is flowing over the outer surface of said subsea pipeline to a temperature higher than the ambient temperature surrounding said subsea pipeline, and

after said seawater is circulated over said portion of the outer surface of said subsea pipeline, recirculating said seawater back into the circulating pumps, past the means of heating said seawater again, and over the portion of the outer surface of said pipeline again,

such that said hydrates, paraffins or the such like will melt and form liquids and/or gases.

2. The method as claimed in claim 1, whereby the method of heating said seawater is by using an electrical resistance heater.

3. The method as claimed in claim 1, whereby the method of heating said seawater is by providing a differential pressure across a pressure reducing means.

4. The method as claimed in claim 1, whereby the method of heating said seawater is by using mixing of chemicals which produce heat upon mixture.

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5. The method as claimed in claim 1, whereby said traction means are rollers which are curved on the outer surface to partially conform the outer surface of said subsea pipeline.

6. The method as claimed in claim 1, whereby the means to sealingly engage the outer surface of said subsea pipeline are resilient flappers.

7. The method of removing hydrates, paraffins or the such like from the inside of a subsea pipeline by repeatedly circulating seawater alternately over a portion of the outer surface of said pipeline and over heating means to cause the hydrates, paraffins, or the such like to melt into liquids and/or gases within said subsea pipeline.

8. The invention of claim 7 wherein said heating means is electric heating.

9. The invention of claim 7 wherein said heating means is flowing said fluid across a pressure reducing means.

10. The invention of claim 7 wherein said heating means is by mixing of chemicals.

11. The invention of claim 7 wherein a circulation chamber is moved along said subsea pipeline while circulating said seawater on said subsea pipeline.

12. The invention of claim 11 wherein resilient seals are provided between said circulation chamber and said subsea pipeline to separate said heated seawater within said circulation chamber from the seawater outside said circulation chamber.

13. The method of removing hydrates, paraffins or the such like from a subsea pipeline by

having a remote vehicle place a circulation chamber adjacent to said pipeline, said circulation chamber having an open side to said pipeline,

repeatedly circulating seawater out of said circulation chamber, through heating

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means, back into said circulation chamber, and across a portion of said pipeline,

such that heated seawater will be circulated across said portion of said pipeline to warm said pipeline and heat added to the seawater not transferred to said portion of said pipeline will increase the inlet seawater temperature to the heating means.

14. The invention of claim 13 wherein said hydrates, paraffins, or the such like are melted into liquids or gases to eliminate a blockage.

15. The invention of claim 13 wherein said heating means is electric heating.

16. The invention of claim 13 wherein said heating means is a flowing said seawater across a pressure reducing means.

17. The invention of claim 13 wherein said heating means is mixing of chemicals.

18. The invention of claim 13 wherein a circulation chamber is moved along said subsea pipeline while circulating said heated fluid on said subsea pipeline.

19. The invention of claim 18 wherein resilient seals are provided between said circulation chamber and said pipeline to separate said heated fluid within said circulation chamber from the seawater outside said circulation chamber.

20. The method of removing a blockage from a subsea pipeline comprising converting energy into heat in an intermediate fluid below sea level and adjacent to said subsea pipeline.

21. The invention of claim 20 wherein said blockage is hydrates, paraffins, or the such like.

22. The invention of claim 21 wherein said hydrates, paraffins, or the such like are melted into liquids or gases to eliminate the blockage.

23. The invention of claim 20 wherein said intermediate fluid is seawater.

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~~25~~. The invention of claim ~~20~~ wherein said heat is generated by electric heating.

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~~26~~. The invention of claim ~~20~~ wherein said heat is generated by a flowing said fluid

across a pressure reducing means.

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~~27~~. The invention of claim ~~20~~ wherein said heat is generated by mixing of chemicals.

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~~28~~. The invention of claim ~~20~~ wherein a circulation chamber is moved along said subsea pipeline while circulating said heated fluid on said subsea pipeline.

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~~29~~. The invention of claim ~~28~~ wherein resilient seals are provided between said circulation chamber and said pipeline to separate said heated fluid within said circulation chamber from the seawater outside said circulation chamber.

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~~30~~. The method of removing a blockage from a buried subsea pipeline of placing a circulation chamber adjacent to said buried subsea pipeline and circulating a heated fluid on a portion of the surface of said buried subsea pipeline.

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~~31~~. The invention of claim ~~30~~ wherein said blockage is hydrates, paraffins, or the such like.

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~~32~~. The invention of claim ~~31~~ wherein said hydrates, paraffins, or the such like are melted into liquids or gases to eliminate the blockage.

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~~33~~. The invention of claim ~~30~~ wherein said fluid is seawater.

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~~34~~. The invention of claim ~~30~~ wherein heat is generated near the seafloor to heat said fluid.

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~~35~~. The invention of claim ~~34~~ wherein said heat is generated by electric heating.

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~~36~~. The invention of claim ~~34~~ wherein said heat is generated by a flowing said fluid across a pressure reducing means.

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³⁶~~37~~. The invention of claim ³³~~34~~ wherein said heat is generated by mixing of chemicals.

³⁷~~38~~. The invention of claim ³⁹~~30~~ wherein said circulation chamber is moved along said buried subsea pipeline while circulating said heated fluid on said subsea pipeline.

³⁸~~39~~. The invention of claim ²⁹~~30~~ wherein resilient seals are provided between said circulation chamber and said pipeline to separate said heated fluid within said circulation chamber from the seawater outside said circulation chamber.

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